



# True 800-Lumen Flashlight

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## TOOLS:

- [Soldering Iron and rosin core solder. \(1\)](#)
- [Various tools for disassembling a computer \(1\)](#)
- [Wire stripper \(1\)](#)
- [knife or dremel \(1\)](#)
- [screwdriver, knife, or other tool to pry surfaces apart \(1\)](#)
- [several Q-tips \(1\)](#)



## PARTS:

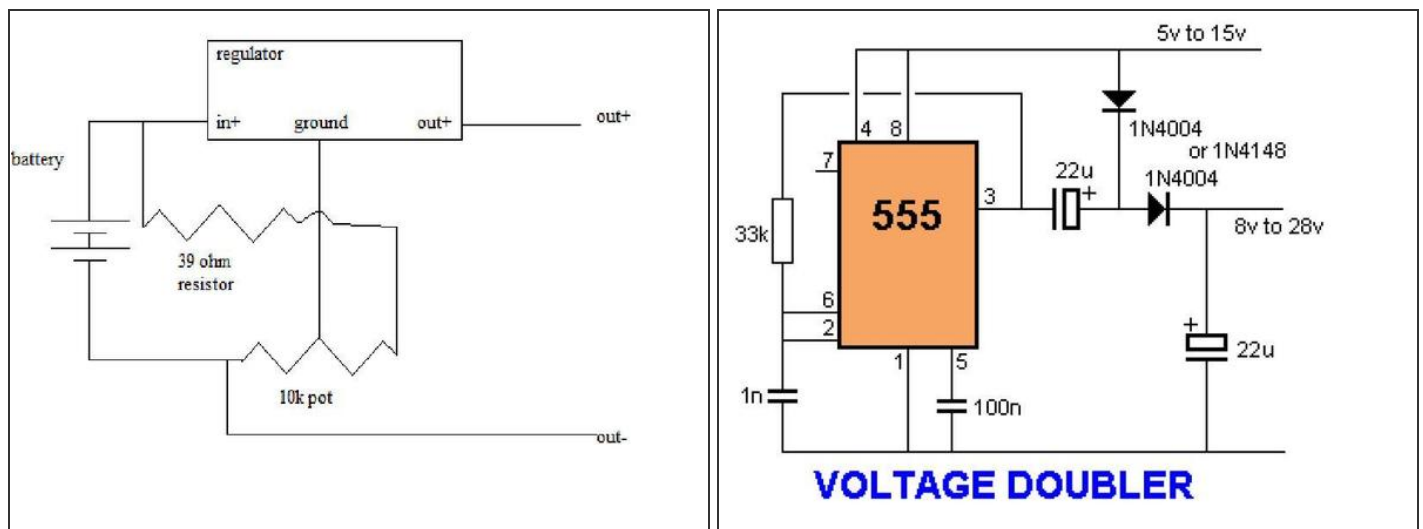
- [4 x 200 lumen 3W High power LED \(superbrightleds.com\), \\$3 each \(1\)](#)
- [broken computer, or heatsink and fan \(1\)](#)
- [rechargeable battery between 8V and 30V, capable of at least 1.5A \(1\)](#)
- [TO-220 case voltage regulator, any voltage below 7.2V \(I used 5V\) \(1\)](#)
- [>10 mfd capacitor, at least the same voltage as your battery. \(1\)](#)
- [10k Pot \(1\)](#)
- [\\*optional\\* knob \(1\)](#)
- [39 ohm resistor \(1\)](#)
- [Wire \(1\)](#)
- [Switch, SPST toggle \(1\)](#)
- [TO-220 heatsink \(1\)](#)
- [555 Timer IC \(1\)](#)
- [2 x 47 mfd capacitor \(1\)](#)
- [15K resistor \(1\)](#)
- [2 small pieces of circuit board \(1\)](#)

- [case with enough room for everything, plus some space to let air flow around the LEDs and regulator. \(1\)](#)
- [12V regulator \(1\)](#)
- [2 x diodes, not zener \(can be 4148, 4001, etc.\) \(1\)](#)

## SUMMARY

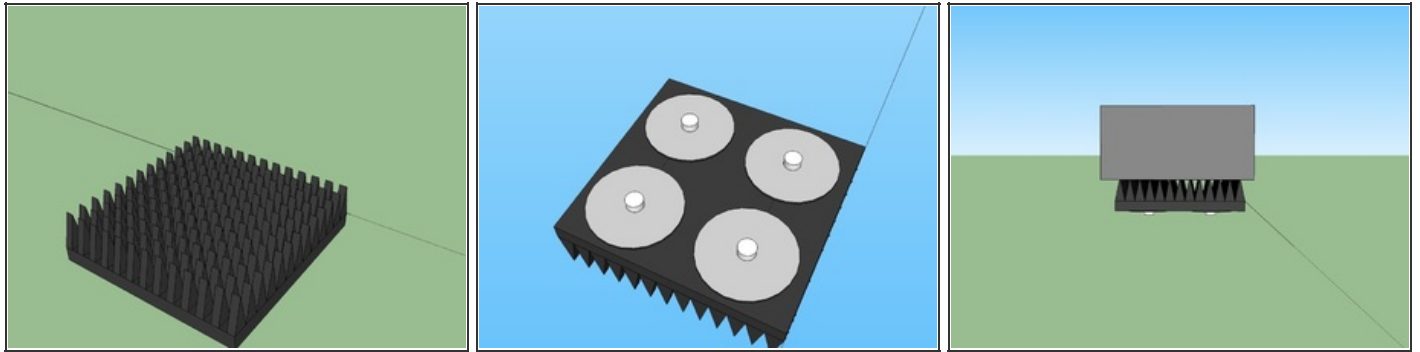
This project is fairly simple, but should use a fairly large housing for good airflow. A good battery should last for a little less than an hour.

### Step 1 — True 800-Lumen Flashlight



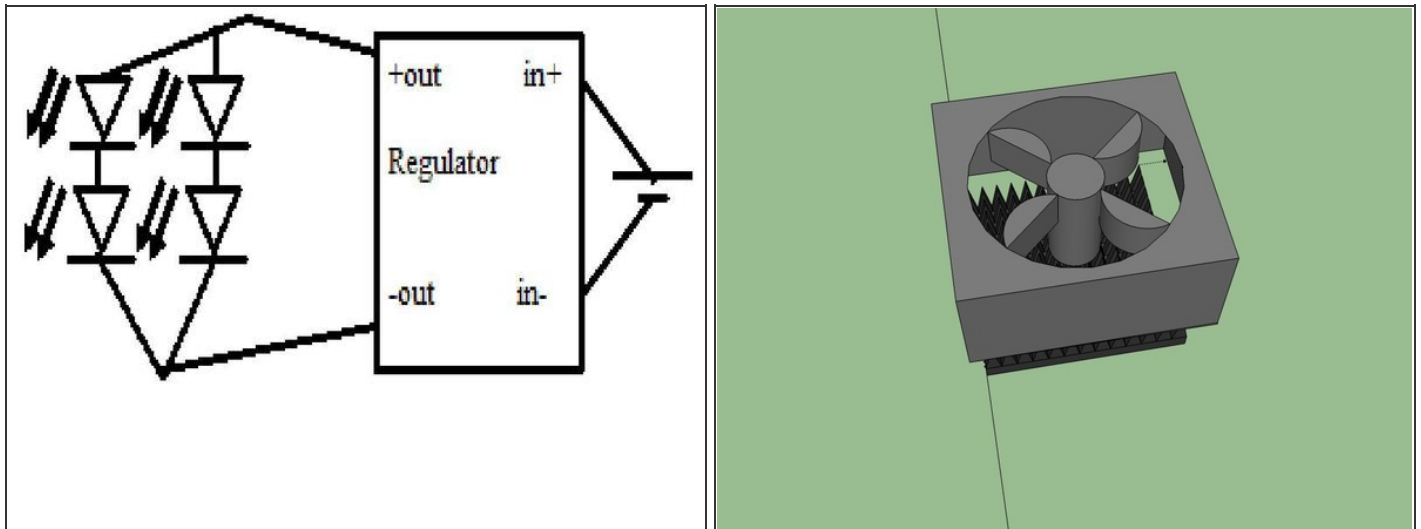
- First, you will build the circuits.
- The first is the regulator. The schematic is the first picture.
- Next is the voltage doubler, schematic in the second picture. (from the e-book "50-555Circuits")
- To test, connect both of them to the battery or equivalent power supply. The doubler should put out 12V, and the regulator should provide reduced voltage. Adjust the potentiometer so that the regulator produces between 7.2V and 7.6V.

## Step 2



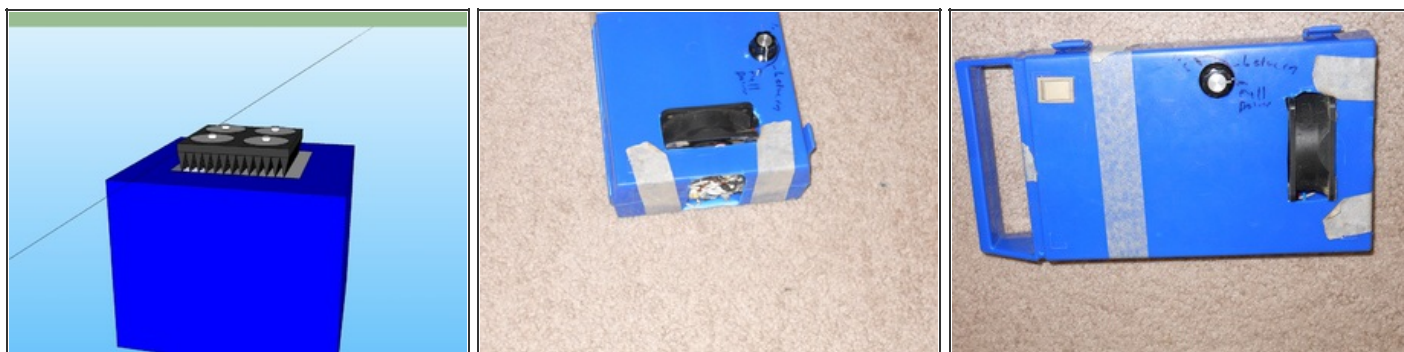
- Now, we will mount the LEDs and fan.
- First, disassemble the computer and pry off the biggest heatsink you can find. I suggest the kind in the first picture.
- Now, pull out a fan. If there are several, go with the one closest to the size of the heatsink.
- Pull out one more small heatsink for the regulator.
- Using heatsink compound, attach the LEDs to the heatsink as in the second picture. If you have no heatsink compound, 2 parts superglue and 1 part plain toothpaste makes a serviceable heatsink compound.
- Finally, just hot glue or super glue the fan to the heatsink as in the 3rd picture so that it blows toward the heatsink. This side almost always has the stationary motor holder.

### Step 3



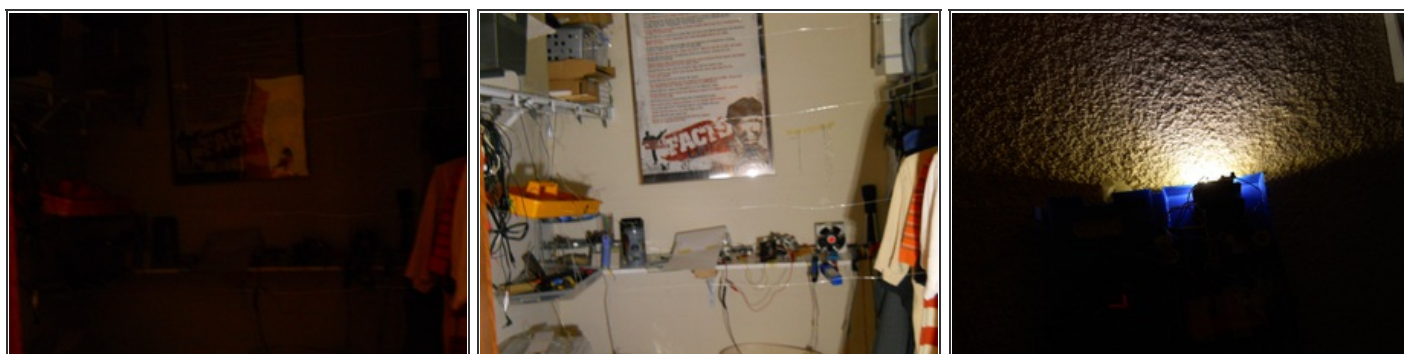
- Connect 2 of the LEDs in series, then connect the others similarly. Connect the 2 sets in parallel.
- Connect the "+" end of the parallel set to the "+" output of the regulator. Turn it on, put on sunglasses and touch the negative LED wire to the regulator's "-" output. If the LEDs turn on, it works. Do not connect it for more than a few seconds at this point.
- Connect the wires from the voltage doubler to the fan, and test it. If it turns on, then add the switch between the battery and circuits, and connect the LED "-" wire.
- Test it again. The fan should turn on, and the LEDs should turn on. They should remain cool to the touch even if run continuously.

## Step 4



- Now cut a few holes in your box, one for the pot and one for the switch.
- Mount the pot and switch, then tape or glue in the battery and circuits. Do not put the LEDs and fan in yet.
- Cut a square exactly the size of the heatsink, so that it (but not the fan) can fit through.
- Insert the LEDs and heatsink through the hole and glue the fan frame in the hole. You should end up with the heatsink outside the box.
- Test it out again. Adjust the potentiometer for the greatest output. It will NOT be all the way to either side. This is to keep the pot from frying due to low resistance and large amounts of power going through.
- I suggest marking the point where it has the most power. Make sure the LEDs do not overheat. If needed, cut some small vents in the enclosure to allow air in.

## Step 5



- Light 'em up!

Basically, you will be building a voltage buck regulator for the LEDs and a voltage boost driver

for the fan. The LEDs will attach to the heatsink, and the heatsink to the fan. Notice that if you have a 24V fan, you will need some extra batteries. Since most fans are 12V, this shouldn't be a problem, but as mine was 24V, I had to use 2 additional small batteries. Ignore them if you have a 12V fan.

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